

Hydrology of Marlborough Summary for July 2022

Report prepared by Charlotte Tomlinson, 9th August 2022.

Data from the Marlborough District Council's Environmental Monitoring network was primarily used in preparing this report and supplemented with data from sites operated by the Marlborough Research Centre, MetService, NIWA, and FENZ.

Executive Summary

Blenheim has recorded its wettest July on record, as well as the highest rainfall total for any month in 93 years (1930-2022). Rainfall around the region had led to higher-than-average monthly rainfall totals and river flows. In particular, the east coast of Marlborough received very high rainfall in July, mostly due to the weather event on the 12th of July, which brought up the east coast rivers (Flaxbourne, Waima, Narrows Creek). The Taylor River also experienced flooding because of this event, causing road and footpath closures in Blenheim.

Significant Weather Event 12th July

The weather event on Tuesday 12th of July was the result of a south-east flow, which brought heavy rainfall to the East Coast area. The Taylor River also experienced significant flooding, causing Nelson Street to close to traffic, as well as closing the Taylor River walking tracks.

The highest rainfall occurred on the East Coast, concentrated around the Ward area. Most of this rainfall occurred over a 12-hour period from 3 am–3 pm on Tuesday 12th of July. As can be seen in the table below, the Te Rapa raingauge in the lower Waima catchment received 149 mm of rain in a 12-hour period, with a return period of 24 years.

Table 1. Rainfall information from key sites, 3am-3pm 12th July 2022.

Site	12-hour rainfall total (mm)	Average Recurrence Interval (years)	Annual probability of event (%)
Te Rapa	149	24	4
Flaxbourne	102	10	10
Taylor at Tinpot	92.2	5	20
Beneagle	80.5	9	11
Taylor Pass Landfill	70.7	16	6
Blenheim at MDC Office	61.5	7	14

The Flaxbourne River reached a maximum flow of approximately 130 m³/s during this event, which can be categorised as a one in 23-year flood.

Rainfall in the Taylor River catchment led to a peak flow at the Hutcheson Street Bridge flow site of approximately 120 m³/s at 8 pm on the 12th of July. This flood event was slightly smaller than the Taylor River flood some may remember in July 2008. The Taylor River flooding can be seen below in Figure 1.



Figure 1. Flooding in the Taylor River at Hutcheson Street Bridge, taken at 4pm on Tuesday 12th July 2022

New Rainfall Record for Blenheim

Data from the Marlborough Research Centre shows Blenheim has recorded its wettest July on record, as well as the highest rainfall total for any month in 93 years (1930-2022). The previous highest rainfall month was September 1943, with 191.5 mm of total rainfall. This is the first time Blenheim's monthly rainfall has surpassed 200 mm.

Total rainfall in Blenheim for July was 220.6 mm, which is 342% of the long-term average for July of 64.5 mm. The previous highest July rainfall was 174.1 mm, recorded in July 1998.

Rainfall

Rainfall around the region has been higher than average this July, as can be seen in the graphs of representative sites below (*Figure 2*). Of note is that Blenheim has had the wettest July and the wettest month on record, with 220.6 mm recorded at the Marlborough Research Centre.

The East Coast area also experienced particularly high rainfall, with the Flaxbourne recording 267.4 mm of rain in July, 360% of average July rainfall at the site.

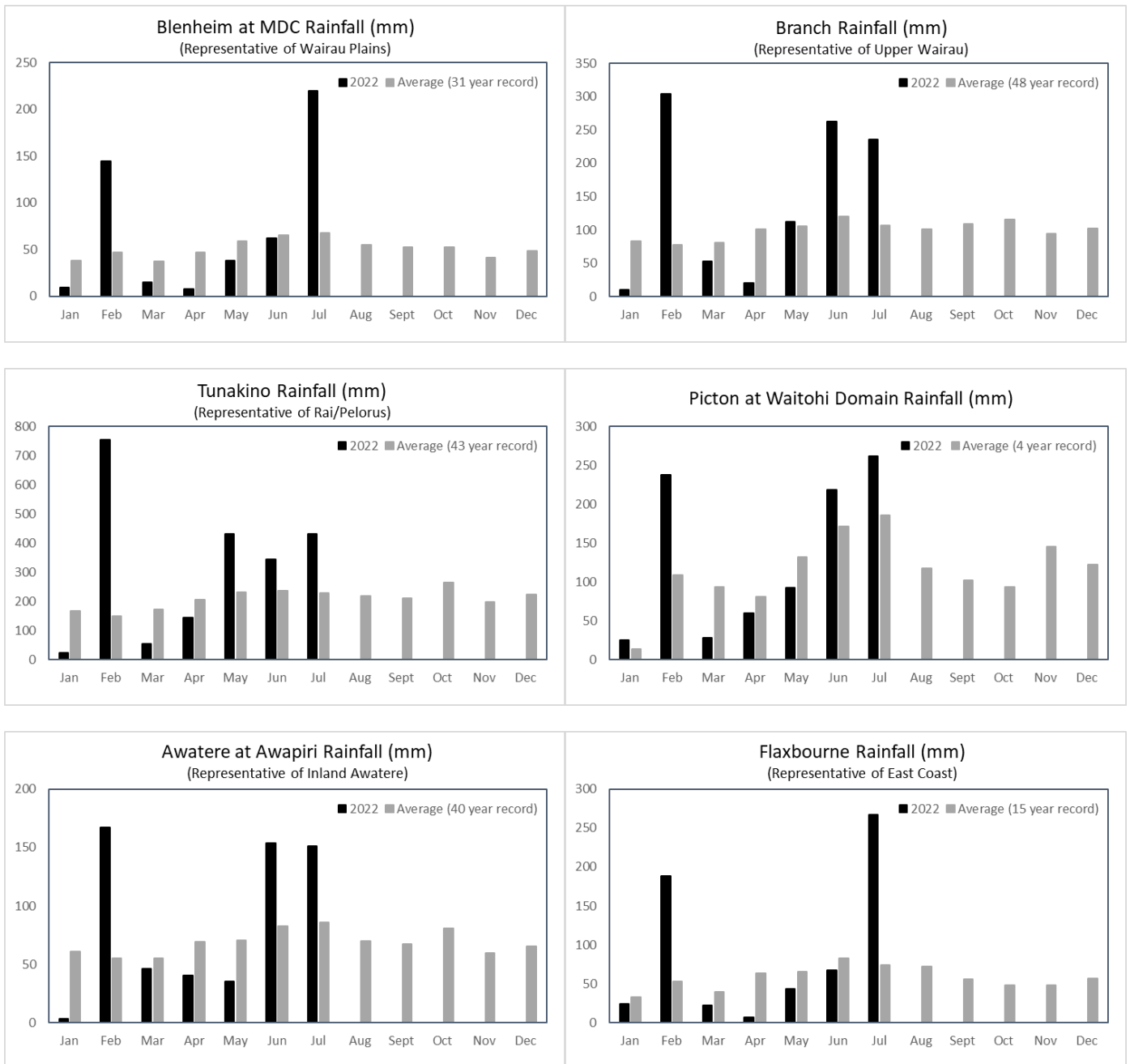


Figure 1. YTD monthly rainfall totals from key sites around Marlborough, compared to average monthly rainfall totals.

Table 2. Year-to-date monthly rainfall totals in Marlborough.

Site	Jan	Feb	Mar	Apr	May	Jun	Jul	Total
Tunakino	25.1	754.7	53.6	145.3	431.1	343.7	431.1	2184.6
Rai at Rai Falls	32.1	544	48.1	118.4	214.4	338	394.2	1689.2
Rai Valley NRFA	26.8	590.6	48	148	200.4	346	418.8	1778.6
Wakamarina at Twin Falls	36.8	418.2	27.2	90.6	199.8	358.9	318.1	1449.6
Kaituna Rainfall at Higgins Bridge	13	283	31.5	81.5	111.5	254	287	1061.5
Kenepuru Head NRFA	7.4	373.2	51	95.8	105.4	360.6	469.2	1462.6
Koromiko NRFA	30.4	300.6	43.6	45	98.8	243.8	337	1099.2
Picton Climate at Waitohi Domain	25.6	237.9	28.4	59.6	92.2	218.2	261.6	923.5
Waikawa at Boons Valley	67	164	20	40.5	77	114	138.5	621
Waikakaho	12.8	250.5	49	25.1	67.1	177.4	357.5	939.4
Wairau at Narrows	8	215.5	25.5	36.5	83.9	156.6	291.5	817.5
Rarangī at Driving Range	9.1	251.1	34.5	17.5	64.3	160.4	309.6	846.5
Lansdowne NRFA	14	262.6	42.6	42.2	70.6	161.4	297.6	891
Wairau Valley at Southwold	9.7	245.1	35.2	42.2	76.9	184.5	294.8	888.4
Onamalutu at Hilltop Road NRFA	18.6	356.4	47.2	84.8	106		462	1075
Onamalutu at Bartletts Creek Saddle	13.3	331	47	85.5	118.9	326.2	458.6	1380.5
Top Valley at Staircase Ridge	16.9	357	58.9	114.5	116.3	320	388.4	1372
Red Hills	21.5	217	78.5	46	136.9	246.6	235.5	982
St Arnaud NRFA	30.6	214	79.4	58.4	173.6	338.4	208.4	1102.8
Malings	25.5	373.5	23	87.5	142.5	307.5	200.5	1160
Branch at Branch Recorder	10.8	304.3	52.7	20.4	112.6	262.2	236	999
Wye at Charlies Rest	20.7	250	32.9	29.7	93.6	194.7	215.2	836.8
Waihopai at Spray Confluence	6.1	199.3	34.4	36.3	73	184.8	216.5	750.4
Tor Darroch NRFA	19.4	216.2	32.4	49.2	76.2	170.4	247.8	811.6
Waihopai at Craiglochart	8.7	204.1	19.5	29.3	56	125	206.2	648.8
Omaka at Ramshead Saddle	7.3	191.4	21	53.4	63.4	140.2	210	686.7
Taylor at Tinpot	8.5	216.4	22.4	37.8	75.2	141.5	309	810.8
Taylor at Taylor Pass Landfill	8	145.6	13.9	9.3	56.4	88.6	226.5	548.3
O Dwyers Road NRFA	13.2	210.6	29.4	19.4	55.8	121.8		450.2
Blenheim at MDC Office	9.5	144.5	15	8	38	62.5	219.5	497
Beneagle at Farm Stream	9.5	157.4	21.3	12.8	75.9	86.4	251.2	614.5
Flaxbourne at Corrie Downs	24	188	22	7.1	43.7	67.4	267.4	619.6
Awatere at Awapiri	3.4	166.9	45.9	40.3	35.3	153.6	151.5	596.9
Awatere Glenbrae NRFA	8.4	161.2	28.4	12	35.4	60.8	168.6	474.8
Mid Awatere Valley NRFA	2	158.6	26.8	21.4	54	128.8	180.8	572.4
Molesworth NRFA	8.8	180.4	20.2	11.8	58.6	182.4	152.4	614.6
Lake Elterwater	19.2	203.8		10.7	47.5	60.9	274.5	616.6
Ward NRFA	29.4	192	40	22.6	65.8	77.2	294	721
Te Rapa	52.1	251.4	46.8	30.8	70.6	72.3	367.3	891.3
Pudding Hill NRFA	11.2	211	16.6	15.6	76.4	144	98.2	573
Upper Clarence NRFA	12	180.2	19.4	5	42	91.2	92.6	442.4

River Flows

Rivers throughout Marlborough are flowing at around 200% of their average July flow, due to a wet month throughout the region.

Table 3. A summary of river flows in Marlborough for July 2022.

River	Site	July mean flow 2022 (m ³ /s)	July mean flow all records (m ³ /s)	% of monthly average	Records begin	Catchment area (km ²)
Pelorus	Bryants	46.75	26.48	177	1977	375
Rai	Rai Falls	27.06	15.41	176	1979	211
Kaituna	Higgins Bridge	12.29	6.69	184	2006	133
Branch	Intake Weir	40.65	23.12	176	1958	550
Wairau	Barnetts Bank	285.24	125.53	227	1960	3,430
Wairau	Dip Flat	49.76	23.03	216	1951	505
Onhinemahuta	Domain	3.92	1.46	268	1998	33
Waihopai	Craiglochart	48.05	19.17	251	1960	764
Awatere	Awapiri	34.96	18.78	186	1977	987
Omaka	Gorge	4.95	2.36	210	1994	90
Taylor	Borough Weir	4.08	1.55	263	1961	64
Flaxbourne	Corrie Downs	6.49	1.39	467	2003	70

Notably, the Flaxbourne River had an average flow of 6.49 m³/s in July, which is 466% of average July river flow. This is primarily due to the weather event on the 12th of July, which saw a south-easterly flow producing large amounts of rainfall in the eastern coastal area of Marlborough.

The Flaxbourne River is estimated to have reached about 130 m³/s at the flood peak on the 12th of July at 2:30 pm. The return period for this event is estimated at 23 years, or a 4.3% chance of occurring in any given year.

Since the monitoring site at the Flaxbourne was established in 2003, three similar flood events have been recorded. As can be seen in Figure 3 below, the July 2008 event is the largest flood recorded in the Flaxbourne, with an estimated peak flow of 133 m³/s, although the August 2012 and July 2022 floods are both of a similar size.

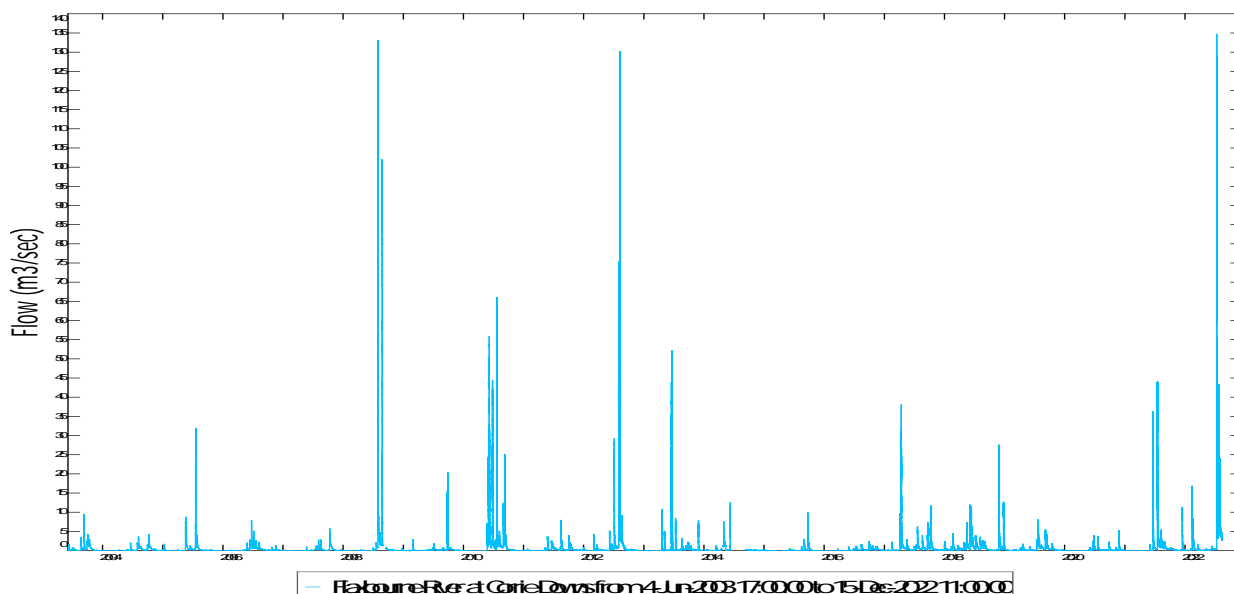


Figure 3. River flow at the Flaxbourne River, 2003 to 2022.

Soil Moisture

As can be seen in the right-hand image in Figure 4 below, average to above-average rainfall throughout the region this winter has led to soils at or near to field capacity in Marlborough, with parts of the Marlborough Sounds in a water surplus. Figure 5 shows Marlborough soils are wetter than normal for this time of year.

Data from the Marlborough Research Centre shows the average shallow soil moisture (0 to 35 cm depth) at the Grovetown Park weather station for July was 38.8%, very close to field capacity.

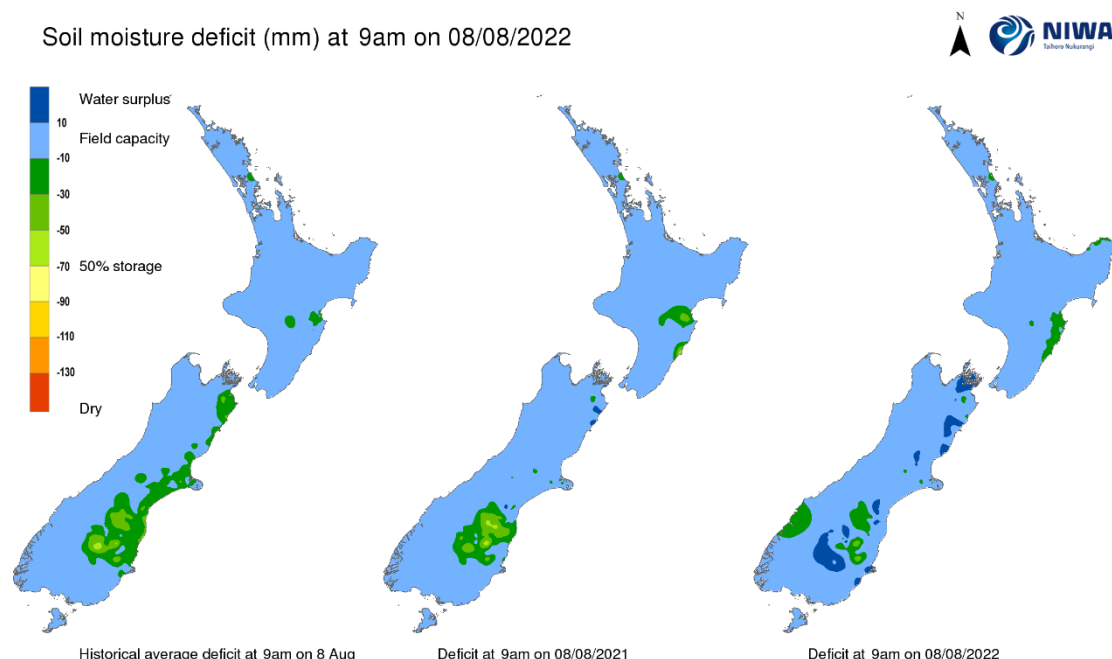


Figure 3. Soil moisture anomaly map of New Zealand, retrieved from NIWA 08/08/2022

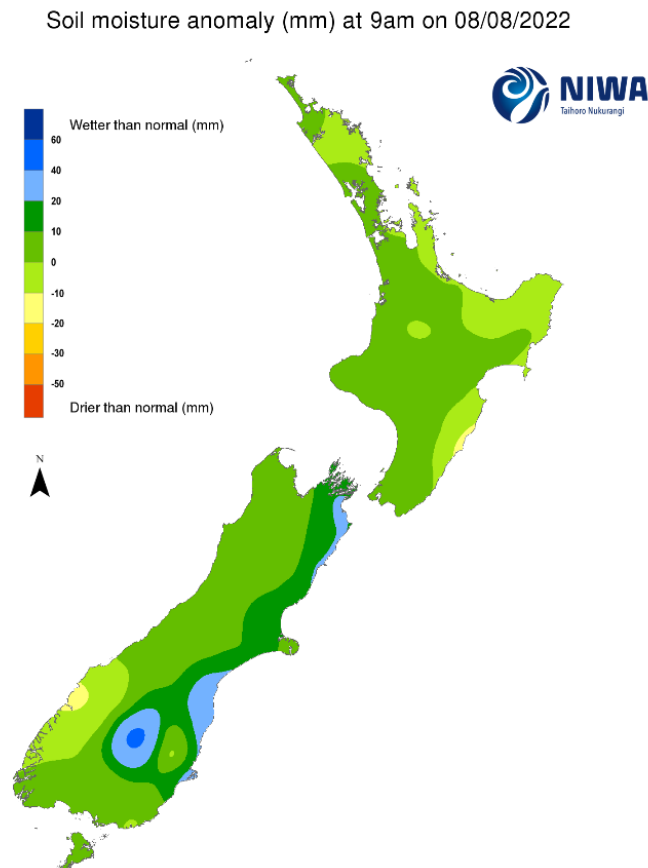


Figure 5. Soil moisture anomaly map of New Zealand, retrieved from NIWA 08/08/2022.

Seasonal Climate Outlook August-October 2022

Throughout July, strong winds in the equatorial Pacific Ocean have cooled sub-surface ocean temperatures. This is predicted to result in a re-strengthening of La Niña conditions in the coming months.

The predictions for Tasman/Marlborough from August to October are:

- 🌡 Temperature – above average
- ☁ Rainfall – near average
- ☘ Soil Moisture – near average
- 🌊 River Flows – near average